


A car accelerates at a rate of 12 m/s/s for 15 s.
If the car starts from rest, what is the final velocity?


 $a = 12 \text{ m/s}^2 \quad t = 15 \text{ s}$
 $v_i = 0 \text{ m/s} \quad v_f = ?$

$$a = \frac{v_f - v_i}{t}$$


$$t \quad a = \left(\frac{v_f}{t} \right) t$$

$$v_f = at$$

$$= (12 \text{ m/s}^2)(15 \text{ s})$$

$$= 180 \text{ m/s}$$

A car is traveling at 35 m/s and comes to rest, with an acceleration of -4.6 m/s/s. How much time did it take for the car to come to rest?


 $a = -4.6 \text{ m/s}^2$
 $v_i = 35 \text{ m/s} \quad v_f = 0 \text{ m/s}$
 $t = ?$

$$a = \frac{v_f - v_i}{t}$$

$$t(a) = \left(\frac{-v_i}{t} \right) t$$

$$\frac{at}{a} = \frac{-v_i}{a}$$

$$t = \frac{-v_i}{a}$$

$$= \frac{-(35 \text{ m/s})}{-4.6 \text{ m/s}^2}$$

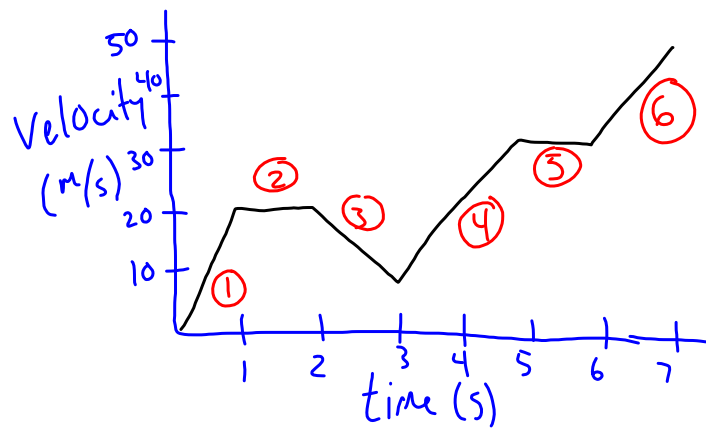
$$= 7.61 \text{ s}$$

<u>Variable</u>	<u>Unit</u>
distance	m
displacement	m
time	s
speed	m/s
velocity	m/s
acceleration	m/s^2 (m/s/s)

How can you change acceleration?

- Change direction (go in a circle)
- Slow down
- Speed up

Velocity-Time Graphs:



$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{velocity}}{\text{time}} = \text{acceleration}$$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{v_2 - v_1}{t_2 - t_1} = \text{acceleration}$$

positive slope \rightarrow velocity is increasing,
so there is a positive acceleration

1, 4, 6 on graph above

negative slope \rightarrow velocity is decreasing,
so there is a negative acceleration

3 on graph above

\emptyset slope \rightarrow constant velocity,
(no) and there is no acceleration